NESSUS® Version 8 Probabilistic Engineering Analysis Software

Winner of the 2005 R&D 100 Award

Southwest Research Institute (SwRI) and Los Alamos National Laboratories (LANL)

TECHNOLOGY

NESSUS® is a general-purpose, probabilistic analysis program that simulates variations and uncertainties in loads, geometry, material behavior and other user-defined inputs to compute the probabilistic response or reliability of engineered systems.

COMMERCIAL APPLICATION

Probabilistic analysis is employed in many industries to predict the reliability of engineered systems and to identify important design and manufacturing variables. Because NESSUS® is interfaced to all major commercial finite element programs and includes unique capabilities for analyzing computational problems, it has been incorporated to initiate solutions in aerospace, gas turbine engines, biomechanics, pipelines, defense, weaponry and infrastructures.

NASA APPLICATIONS

◆ NESSUS® was originally developed as a reliability assessment tool for the space shuttle main engine.

◆Further developed for application to large-scale, aero-propulsion system problems investigated at NASA Glenn Research Center.

SOCIAL/ECONOMIC BENEFIT

NESSUS® Version 8 has been used for probabilistic fracture mechanics analysis of flowliner feed line to the Space Shuttle Main Engine, automotive engine crankshaft reliability and probabilistic tunnel vulnerability analysis. NESSUS® provides probabilistic solution capabilities for real-world applications which far exceed those of any competing software. This version allows NESSUS® to be tailored for specific computer systems to include a distributed parallel processing capability to efficiently analyze complex problems. The software is also being used as an instructional tool to teach probabilistic design at the university level.

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